STATEMENT OF BASIS

Alabama Power Company
Washington County Cogeneration Plant
McIntosh, Alabama
Washington County
108-0018

This proposed renewal to the Title V Major Source Operating Permit is issued under the provisions of ADEM Admin. Code r. 335-3-16. The above-referenced applicant has applied to renew the existing Title V Permit, which was originally issued on August 13, 2003. The applicant has requested authorization to perform the work or operate the facility shown on the application and drawings, plans and other documents, which were submitted on September 30, 2020, and are attached hereto or on file with the Air Division of the Alabama Department of Environmental Management, in accordance with the terms and conditions of this permit.

The Washington County Cogeneration Plant is owned and operated by Alabama Power Company and is located in McIntosh, Alabama. The Washington County Cogeneration Plant provides steam to the adjacent Olin Chemical Plant (Olin) and generates nominally 102 MW (137 MW peak) of electric power for distribution to Alabama Power customers. Although this plant is adjacent to Olin, the Washington County Cogeneration Plant is a separate source that is not under common control or ownership.

The Washington County Cogeneration Plant was issued its existing Major Source Operating Permit (MSOP) on April 4, 2016 with an expiration date of March 31, 2021. Per ADEM Rule 335-3-16-.12(2), an application for permit renewal shall be submitted at least six (6) months, but not more than eighteen (18) months, before the date of expiration of the permit. Based on this rule, the application for renewal was due to the Department no later than September 30, 2020, but no earlier than September 30, 2019. An application for permit renewal was received by the Department on September 30, 2020. Additional information was received by the Department on January 25, 2021.

This Title V Major Source Operating Permit renewal will also incorporate changes at the facility since the last Major Source Operating Permit.

- Addition of a 400 kW (536 HP) Diesel Emergency Generator
- Modification to Combined Cycle Duct Burner (Air Permit No. 108-0018-X009)

With the changes made to the Washington County Plant as stated above, the following are the significant sources of air pollutants at the facility:

- 100 MW Combustion Turbine with 260 MMBtu/hr Duct Burner and Heat Recovery Steam Generator
- 184 MMBtu/hr Package Boiler (PB 201R)
- 184 MMBtu/hr Package Boiler (PB 301R)
- 274 MMBtu/hr Package Boiler w/ FGR (PB 401R)

- 400 kW (536 HP) Diesel Emergency Generator

Facility Wide Emissions

Pollutant	Potentials (TPY)	2019 Actuals (TPY)
NO_x	744.0	195.7
CO	589.8	53.8
VOC	48.0	33.1
SO_2	5.63	2.8
PM	63.9	15.3
HAPs (total)	11.0	5.0
GHG (CO_{2e})	1,028,232	556,431

100 MW Combustion Turbine with 260 MMBtu/hr Duct Burner

The combined cycle unit (combustion turbine with duct burner and heat recovery steam generator) generates nominally 102 megawatts (137 MW peak) of electric power for distribution. The combustion turbine generates approximately 80 megawatts (100 MW peak) of electric power and fires only pipeline quality natural gas. The duct burner has a heat input rating of 260 MMBtu/hr and provides the capability to produce additional steam for the heat recovery steam generator (HRSG). The duct burner fires natural gas and/or hydrogen. Steam produced by the HRSG is sent to the adjacent Olin Chemical plant and the remainder is used to run a steam turbine with a capacity of 22 MW (37 MW peak).

The combined cycle unit was subject to a Prevention of Significant Deterioration (PSD) Review in which BACT was established for NO_x, CO, VOC, and PM. The combustion turbine is subject to the Federal New Source Performance Standards (NSPS) contained in 40 CFR Part 60, Subpart GG, and the duct burner is subject to NSPS Subpart Db. The combined cycle unit is also subject to the Acid Rain Program and the Cross-State Air Pollution Rule (CSAPR). The combined cycle unit's expected emissions and the associated standards are listed below.

Emission Standards

Opacity:

- Visible Emissions from the combined cycle/duct burner stack shall not exceed 10%.

  (ADEM Admin. Code r. 335-3-14-.04(9)(b)) BACT

Particulate Matter (PM):

- Particulate emissions from the combustion turbine shall not exceed 0.01 lb/MMBtu and 5.0 lbs/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-.04(9)(b)) BACT

- The Particulate emissions from the duct burner shall not exceed 0.02 lb/MMBtu and 2.9 lbs/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-.04(9)(b)) BACT

- Particulate emissions from the combined turbine/duct burner stack shall not exceed 0.01 lb/MMBtu and 7.9 lb/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-.04(9)(b)) BACT

The PM emission standards apply at all times except during startup, shutdown, and load change; at which times the Permittee shall comply with work practice standards.

Sulfur Dioxide (SO_2):

The combined cycle unit is subject to the Acid Rain Regulations. This unit is not allocated SO_2 allowances under Phase II of the Acid Rain Program. The unit shall hold sufficient allowances in the unit account to cover annual SO_2 emissions.

(ADEM Admin. Code r. 335-3-18-.01 and 40 CFR Part 73)

- The SO_2 emissions from the combustion turbine shall not exceed 150 ppmvd (at 15% O_2) or a fuel sulfur limit of 0.8% by weight.

  (40 CFR 60.333)

Nitrogen Oxides (NO_x):

- Nitrogen Oxides emissions from the combustion turbine shall not exceed 15 ppmvd @ 15% O_2 and 62.5 lbs/hr. The emissions limits are BACT limits resulting from a PSD review. These emission limits are *always* at least as stringent as those listed in 40 CFR 60 Subpart GG.

  (ADEM Admin Code r. 335-3-14-.04(9)(b)) BACT

- Nitrogen Oxides emissions from the duct burner shall not exceed 0.20 lb/MMBtu and 34.0 lbs/hr. The emissions limits are BACT limits resulting from a PSD review. These emission limits are *always* at least as stringent as those listed in 40 CFR 60 Subpart Db.

  (ADEM Admin Code r. 335-3-14-.04(9)(b)) BACT

- Nitrogen Oxides emissions from the combined combustion

turbine/duct burner stack shall not exceed 0.09 lb/MMBtu and 96.5 lbs/hr. The emissions limits are BACT limits resulting from a PSD review. These emission limits are *always* at least as stringent as those listed in 40 CFR 60 Subpart GG.

(ADEM Admin Code r. 335-3-14-.04(9)(b)) BACT

- The NO_x emissions from the combustion turbine shall not exceed:

$$STD = 0.0075\frac{(14.4)}{Y} + F$$

Where:

$STD = allowable\ NOx\ emission\ Concentration$

$Y = heat\ rate\ at\ manufacturer's\ rated\ load\ \left(\frac{KJ}{Whr}\right)$

$F = NOx\ emission\ allowance$

(40 CFR 60.332)

The NO_x emission standards apply at all times except during startup, shutdown, and load change; at which times the Permittee shall comply with work practice standards.

Carbon Monoxide (CO):

- Carbon Monoxide emissions from the combustion turbine shall not exceed 0.07 lb/MMBtu and 61.5 lbs/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-04) BACT

- Carbon Monoxide emissions from the duct burner shall not exceed 0.07 lb/MMBtu and 18.2 lbs/hr when operating above a heat input of 130 MMBtu/hr and 0.1 lb/MMBtu when operating at or below a heat input of 130 MMBtu/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-04) BACT

- Carbon Monoxide emissions from the combined combustion turbine/duct burner stack shall not exceed 0.08 lb/MMBtu and 79.7 lbs/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-04) BACT

The CO emission standards apply at all times except during startup, shutdown, and load change; at which times the Permittee shall comply with work practice standards.

Volatile Organic Compounds (VOC):

- Volatile Organic Compound emissions from the combustion turbine shall not exceed 3.7 lbs/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-04) BACT

- Volatile Organic Compound emissions from the duct burner shall not exceed 3.4 lbs/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-04) BACT

- Volatile Organic Compound emissions from the combined combustion turbine/duct burner stack shall not exceed 7.1 lbs/hr. The emissions limits are BACT limits resulting from a PSD review.

  (ADEM Admin. Code r. 335-3-14-04) BACT

The VOC emission standards apply at all times except during startup, shutdown, and load change; at which times the Permittee shall comply with work practice standards.

Expected Emissions

Particulate Matter (PM) and Opacity:

- During initial performance testing, the PM emission rate was approximately 0.0033 lb/MMBtu while firing the duct burner, which should represent the worst-case operating scenario. No visible emissions are expected from the unit while firing natural gas.

Sulfur Dioxide (SO_2):

- Natural gas is the primary fuel for this unit. Based on the sulfur content of natural gas, an SO_2 emission rate of approximately 0.0006 lb/MMBtu is expected.

Nitrogen Oxides (NO_x):

- The unit is required to monitor NO_x with a Continuous Emissions Monitoring System (CEMS). CEMS data indicates that NO_x emissions from the Combined CT and Duct Burner are below the permitted emission limits. During the 2003 compliance stack test for the unit, the NO_x emissions were 0.06 lb/MMBtu and 66.7 lb/hr. for the combined unit, which is below the permit limits.

Carbon Monoxide (CO):

- During the 2003 compliance testing, the CO emission rates from the

unit were below the permitted allowable emissions limits. The CO emission rates for the combined unit were 0.0004 lb/MMBtu, and 0.4167 lb/hr.

Volatile Organic Compounds (VOC):

- During initial compliance testing, the VOC emission rates from the unit were below the permitted allowable emissions limits. The VOC emission rates for the combined unit were approximately 0.0067 lb/MMBtu, and 0.7 lb/hr.

Green House Gases (GHG):

- The estimated potential greenhouse gas emissions for the unit are 697,529 CO_2 equivalent Tons/yr.

Periodic Monitoring

Particulate Matter (PM) and Opacity:

- Based on the low expected levels of emissions as compared to the regulatory allowable emission limits, periodic monitoring of opacity and particulate matter emissions is not considered necessary.

Sulfur Dioxide (SO_2):

- The provisions in 40 CFR Part 75 are utilized to track annual SO_2 emissions. Since emissions of SO_2 are expected to be minimal, additional monitoring for SO_2 is not considered necessary.

Nitrogen Oxides (NO_x):

- This unit is required by 40 CFR Part 75 to maintain and operate a NO_x Continuous Emissions Monitoring System (CEMS). The NOx CEMS will be utilized for periodic monitoring of NO_x emissions.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC):

- Based on the low expected levels of emissions as compared to the regulatory allowable emission limits, monitoring of CO and VOC emissions is not considered necessary.

Recordkeeping and Reporting

- An emission report as defined by 40 CFR 60.7(c) will be submitted to the ADEM within 30 days of the end of the calendar quarter

  (ADEM Admin. Code r. 335-3-16-.05(c) and ADEM Admin. Code r. 335-3-1-.04)

- The permittee shall submit the applicable report(s) to the Department

according to the requirements of the Greenhouse Gas Reporting Rule in 40 CFR 98.

(40 CFR Part 98)

Compliance Assurance Monitoring (CAM)

Since no control equipment is utilized to meet any applicable emissions limitations, CAM does not apply to any pollutant emitted by this unit.

Cross-State Air Pollution Rule

- This unit is subject to the applicable provisions of Cross-State Air Pollution Rule (CSAPR) to include all applicable provisions of the SO_2 Group 2 Trading Program requirements.

  (ADEM Admin. Code r. 335-3-5-.06 through 335-3-5-.36)

- This unit is subject to the applicable provisions of Cross-State Air Pollution Rule (CSAPR) to include all applicable provisions of the NOx Annual and Seasonal Trading Program requirements.

  (ADEM Admin. Code r. 335-3-8-.07 through 335-3-8-.70)

274 MMBtu/hr Package Boiler (PB 401R)

The 274 MMBtu/hr Package Boiler can be fired by natural gas or hydrogen. This boiler is normally used for backup purposes to ensure adequate steam supply to the Olin plant. Although allowed to operate full time, the unit's normal capacity factor is less than 10% with the majority of that operating time firing natural gas. Flue gas recirculation (FGR) is utilized by this unit to reduce NO_x emissions.

This boiler is subject to the New Source Performance Standards (NSPS) contained in 40 CFR Part 60, Subpart Db.

The expected emissions and the associated standards for the 274 MMBtu/hr Package Boiler (PB 401R) are listed below.

Emission Standards

Opacity:

- Any source of particulate emissions shall not discharge more than one 6-minute average opacity greater than 20% in any 60-minute period. At no time shall any source discharge a 6-minute average opacity of particulate emissions greater than 40%.

(ADEM Admin. Code r. 335-3-4-.01(1))

Particulate Matter (PM):

- The boiler shall not discharge PM in excess of 0.12 lb/MMBtu.

(ADEM Admin. Code r. 335-3-4-.03 Table 4-1)

Sulfur Dioxide (SO_2)

- The boiler has an allowable sulfur dioxide emission rate of 4.0 lbs/MMBtu.

(ADEM Admin. Code 335-3-5-.01(1)(b))

Nitrogen Oxides (NO_x):

- Nitrogen Oxide emissions shall not exceed 0.20 lb/MMBtu.

(40 CFR 60 Subpart Db)

Carbon Monoxide (CO):

- There are no applicable CO limits.

Volatile Organic Compounds (VOC):

- There are no applicable VOC limits.

Expected Emissions

Particulate Matter (PM) and Opacity:

- Emissions are expected to be 0.66 lb/hr and 2.88 TPY based on AP-42 emission factors and 8,760 hours per year of operation.

Sulfur Dioxide (SO_2):

- Natural gas is the primary fuel for this unit, resulting in an emission rate of approximately 0.16 lb/hr and 0.72 TPY based on AP-42 emission factors and 8,760 hours per year of operation.

Nitrogen Oxides (NO_x):

- This unit is required to monitor NO_x with a Continuous Emissions Monitoring System (CEMS). 2019 CEMS data indicate that NO_x emissions from the 274 MMBtu/hr Package Boiler are expected to be 0.026 lb/MMBtu.

Carbon Monoxide (CO):

- Emissions are expected to be 21.92 lb/hr and 96.01 TPY based on vendor data and 8,760 hours per year of operation.

Volatile Organic Compounds (VOC):

- Emissions are expected to be 1.64 lb/hr and 7.20 TPY based on

vendor data and 8,760 hours per year of operation.

Periodic Monitoring

Particulate Matter (PM) and Opacity:

- Based on the low expected levels of emissions as compared to the regulatory allowable emission limits, periodic monitoring of opacity and particulate matter emissions is not considered necessary.

Sulfur Dioxide (SO_2):

- Based on natural gas and hydrogen being the only fuels for the boiler and the low expected SO_2 emissions, no periodic monitoring of SO_2 emissions is considered necessary.

Nitrogen Oxides (NO_x):

- The NO_x emission rate from these units shall be monitored by a NO_x Continuous Emissions Monitoring System (CEMS). The NO_x emission rate shall be monitored on a 30-day rolling average. The NO_x CEMS shall be maintained and certified using the procedures of 40 CFR 60.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC):

- There are no applicable limitations for CO and VOC emissions, therefore, no monitoring is needed.

Recordkeeping and Reporting

- Within 30 days after the end of each calendar quarter, the permittee will submit an excess NO_x emissions report (EER) to the Department. This report shall contain all the applicable information required by 40 CFR 60.49b.

  (40 CFR 64.49b)

- The permittee shall maintain records verifying that only natural gas and/or hydrogen was combusted in this package boiler.

  (40 CFR 64.49b(r))

- The permittee shall submit the applicable report(s) to the Department according to the requirements of the Greenhouse Gas Reporting Rule in 40 CFR 98.

  (40 CFR Part 98)

Compliance Assurance Monitoring (CAM)

As this unit is only subject to a NOx limit due to a NSPS promulgated after November 15, 1990, the auxiliary boiler is **not** subject to CAM for NO_x. Per §64.2(b)(i) the package boiler is considered exempt from all applicable parts of 40 CFR 64 for the NOx NSPS limit.

Even though other pollutants' potential emissions are greater than the respective major source threshold, no control devices are used to meet any applicable limitations; therefore, CAM does not apply to those pollutants.

Two (2) 184 MMBtu/hr Package Boilers (PB 201R & PB 301R)

These boilers can be fired by natural gas or hydrogen. In order to avoid a PSD review for PB201R and PB301R, Alabama Power accepted emission limits to remain below the significant thresholds. The units are subject to the New Source Performance Standards (NSPS) contained in 40 CFR Part 60, Subpart Db. Flue gas recirculation (FGR) is utilized by each of the units to reduce NO_x emissions.

The expected emissions and the associated standards for the two (2) 184 MMBtu/hr Package Boilers (PB 201R & PB 301R) are listed below.

Emission Standards

Opacity:

- These units shall not discharge more than one 6-minute average opacity greater than 20% in any 60-minute period. At no time shall these units discharge a 6-minute average opacity of particulate emissions greater than 40%.

  (ADEM Admin. Code r. 335-3-4-.01)

Particulate Matter (PM):

- The particulate matter emission rate from each of these units shall not exceed 3.0 lb/hr as determined by the "Process Weight Equation", except during periods of startup, shutdown, or load change.

  (ADEM Admin. Code r. 335-3-14-.04) Anti-PSD

Sulfur Dioxide (SO_2):

- These boilers shall fire only natural gas and/or hydrogen.

  (ADEM Admin. Code r. 335-3-14-.04) Anti-PSD

- The SO_2 emission rate shall not exceed 4.0 lb/MMBtu.

(ADEM Admin. Code r. 335-3-5-.01(1)(b)

Nitrogen Oxides (NO_x):

- The Nitrogen Oxides emission rate from each of these units shall not exceed 0.20 lb/MMBtu based on a 30-day rolling average.

  (40 CFR 60.44b)

- The Nitrogen Oxides emission rate from each of these units shall not exceed 9.0 lb/hr, except during startup, shutdown, or load change, based on a 3-hour rolling average.

  (ADEM Admin. Code r. 335-3-14-.04) Anti-PSD

Carbon Monoxide (CO):

- There are no applicable CO limits.

Volatile Organic Compounds (VOC):

- There are no applicable VOC limits.

Expected Emissions

Particulate Matter (PM) and Opacity:

- During initial performance testing for PB301R, the PM emission rate was measured at multiple loads while firing natural gas and a combination of natural gas and hydrogen. The maximum emission rate was 0.2455 lb/hr, which was well below the permitted allowable emissions limit of 3.0 lb/hr. PB201R has a vendor guarantee for particulate emissions of 2.21 lb/hr. No visible emissions are expected from the units while firing natural gas or hydrogen.

Sulfur Dioxide (SO_2):

- Minimal emissions of SO_2 would be expected based upon the firing of natural gas and hydrogen.

Nitrogen Oxides (NO_x):

- During initial compliance testing, the NO_x emission rates were measured at multiple loads while firing natural gas and a combination of natural gas and hydrogen. The maximum emission rates from PB301R were 0.0321 lb/MMBtu and 5.1841 lb/hr, below the permitted allowable emission limits of 0.2 lb/MMBtu and 9.0 lb/hr. The maximum emission rates from PB201R were determined by the Department to be 7.41 lb/hr, below the 9.0 lb/hr limit.

Carbon Monoxide (CO):

- Emissions are expected to be 16.38 lb/hr and 71.74 TPY based on vendor data and 8,760 hours per year operation.

Volatile Organic Compounds (VOC):

- Emissions are expected to be 1.10 lb/hr and 4.84 TPY based on vendor data and 8,760 hours per year operation.

Periodic Monitoring

Particulate Matter (PM) and Opacity:

- Based on the low expected levels of emissions as compared to the regulatory allowable emission limits, periodic monitoring of opacity and particulate matter emissions is not considered necessary while firing natural gas or hydrogen.

Sulfur Dioxide (SO_2):

- Based on natural gas being the exclusive fuel for the boilers and the low expected SO_2 emissions, no periodic monitoring of SO_2 emissions is considered necessary.

Nitrogen Oxides (NO_x):

- The NO_x emission rate from this unit shall be monitored by a NO_x Continuous Emissions Monitoring System (CEMS). The NO_x emission rate shall be monitored on a 30-day rolling average. The NO_x CEMS shall be maintained and certified using the procedures of 40 CFR 60.

Carbon Monoxide (CO) and Volatile Organic Compounds (VOC):

- There are no applicable limitations for CO and VOC emissions; therefore, no monitoring is needed.

Recordkeeping and Reporting

- Within 30 days after the end of each calendar quarter, the permittee will submit an excess NO_x emissions report (EER) to the Department. This report shall contain all the applicable information required by 40 CFR 60.49b.

  (40 CFR Part 64.49b)

- Records documenting the amount and type of fuel burned in the boiler each day it is operated shall be kept in a form suitable for inspection for a period of at least five years following said recording.

  (40 CFR 60.49b(d))

- The permittee shall submit the applicable report(s) to the Department according to the requirements of the Greenhouse Gas Reporting Rule in 40 CFR 98.

(40 CFR Part 98)

Compliance Assurance Monitoring (CAM)

The only pollutant subject to Compliance Assurance Monitoring (CAM) is NO_x since the units utilize control devices, Flue Gas Recirculation (FGR), to meet applicable limits, and the pre-controlled potential NO_x emissions from the units are greater than 100 TPY. Even though other pollutants' potential emissions are greater than the respective major source threshold, no control devices are used to meet any other applicable limitations; therefore, CAM does not apply to those pollutants.

This unit is required by 40 CFR Part 60 to maintain and operate a NO_x Continuous Emissions Monitoring System (CEMS). The CEMS will also serve as the compliance assurance monitoring for NOx. Details of the CAM Plan are attached to this document.

Plant Emergency Generator

The 536 HP (400 kW) Plant emergency engine is powered by diesel and subject to 40 CFR Part 60, Subpart IIII and 40 CFR Part 60, Subpart ZZZZ. The expected emissions and the associated standards for the plant emergency generator are listed below.

By meeting the applicable requirements of 40 CFR Part 60 Subpart IIII, this unit is considered to be in compliance with 40 CFR Part 63 Subpart ZZZZ.
40 CFR 63.6590(c))

Emission Standards

Opacity:

- These units shall not discharge more than one 6-minute average opacity greater than 20% in any 60-minute period. At no time shall these units discharge a 6-minute average opacity of particulate emissions greater than 40%.

(ADEM Admin. Code r. 335-3-4-.01)

NMHC + NOx, PM, and CO:

- Owners and operators of 2007 model year and later emergency stationary CI ICE with a displacement of less than 30 liters per cylinder that are not fire pump engines must comply with the emission standards for new nonroad CI engines in §60.4202, for all pollutants, for the same model year and maximum engine power for their 2007

model year and later emergency stationary CI ICE.

40 CFR 60.60.4205(b)

Expected Emissions

The expected emissions shown below are based on AP-42 emission factors, manufacturer's data, and a maximum operation of 500 hours per year. CO_2e emissions were based on 40 CFR Part 98 emission factors.

Pollutant	Plant Emergency Engine	
	lb/hr	TPY
PM_{10}/ $PM_{2.5}$	0.118	0.03
SO_2	1.04	0.26
NO_X	5.44	1.36
CO	1.42	0.36
CO_2e	587.7	146.9

Monitoring
Based on the low levels of expected emissions from these units, no monitoring is necessary for this unit.

Recordkeeping and Reporting

- The permittee shall keep records of the operation of this engine in emergency and non-emergency service that are recorded through the non-resettable hour meters. The permittee must also record the time of operation of the engine and the reason the engine was in operation during that time.

  40 CFR 60.4214(b)

Compliance Assurance Monitoring (CAM)
This unit has no pollution control equipment. Therefore, CAM does not apply.

Recommendation:

Based on the above analysis and pending the resolution of any comments received during the 30-day public comment period and 45-day EPA review, I recommend issuing the attached renewal MSOP for Alabama Power-Washington County Cogeneration Plant.

Tyler Phillips

December 30, 2020
Date

Industrial Minerals Section
Energy Branch
Air Division